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ABSTRACT

This paper describes interactive video and the advantages and disadvantages to using interactive video in education and training. Examples of classroom use of interactive video are discussed in terms of its benefits as an educational strategy and the drawbacks of teacher preparation. It is noted that there are currently three levels of interactive video use: (1) a monitor and videodisc player with interaction accomplished manually by manipulating the videodisc player; (2) a videodisc player with a built-in microprocessor which executes precoded programs on the disc; and (3) a videodisc player interfaced with a computer and controlled by a program authored by the user. Other advantages of interactive video discussed include use of color, motion, branching, feedback, data storage, information presentation, and slide presentation. Other disadvantages noted include cost, lack of courseware, and teacher attitudes toward their changing role in the classroom. Potential uses of interactive video in classrooms are described. The 58-item annotated bibliography makes up nearly half of the document. (DB)

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Implications of Interactive Video for Education and Annotated Bibliography

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(Note - I have written the beginning part of this paper in the language you will find in many journals)

Are there advantages to using CDI, CVIB or IAV in education and training? Should you think about using one of these systems in your classes? There are many signs of expansion in the IVD market. Maybe you should get involved. Many seminars and conferences on optical discs have focused on CD-ROM, CD-I, DVI, CD-V or IVD. Many factors are propelling the growth of IVD. One factor is the Army EIDS contract. Another is the entrance of IBM into the market and a third is IBM's development of the PALS program. Another strong sign of expansion in the IVD market is that the DOD has an RFP to manufacturers asking them to develop standards for an IVD system for the U.S. Army. P-O-P and P-O-I applications account for many of the recent uses. CTL centers are opening across the U.S. Attitudes are mostly positive from all levels of education.

If you are interested in using IVD, you need to decide whether your discs should be Level I, II, III, or IV. For a look at discs before you start you could learn about the Philips' "Van Gogh" or "Leonardo" discs in the BUFVC's videodisc newsletter. Project CENT and Project COM-I-Con are examples of interactive video projects in social studies. MECC

is also involved in developing educational discs.

For hardware, you will want a player that can play both CAV and CLV discs and preferably one that has a standard RS232 Serial Port. You might prefer to wait for the development of a level IV player which will play CD's. If you decide on a Level III system, you would need to purchase either an authoring system, which is menu-driven, or an authoring language which is command driven. For authoring interactive lessons, you could choose the BCD authoring system or authoring languages such as Super PILOT, PASS, ADAPT or IAS. You could also use a general programming language such as BASIC.

If you are interested in the developing side of IAV, you have to decide whether to use still frames or CBI. Your project coordinator should use a PERT, Gannt chart, CPM or PSN in addition to a PFA. Some manufacturers prefer to use one half Betacam, while others prefer one inch type C tape. You need to know this information before you videotape.

For a graphics generator, Quantil is popular but Ditoner and Bosch are also used. All are NTSC systems. There are also computer generated graphics systems that put out RGB signals that can only be produced on computer terminal screens. In completing a needs analysis and development of the disc, you need a clear set of objective heirarchies in clear I.S.D.

terms.

Discouraged? Confused? If you are interested in researching interactive video, this is the language you are going to find. Let's try this a different way.

It is September 30, 1987, 9:00 A.M. at Cambridge (pseudonym) High School. Mr. Bemer (pseudonym), the head of the science department, has finished naming and explaining the features of the planets. He has drawn three or four diagrams on the board. There are fourteen students in this basic level earth science class - they are sitting in varying degrees of relaxation. Mr. Bemer pulls the audiovisual cart from the front corner of the room and begins the interactive video portion of the lesson. On the top of the cart is a T.V. On the lower shelf is a Pioneer discplayer suitable for a Level I or Level III use. Mr. Bemer puts what looks like a shiny aluminum record into the player and holds a remote control pad in his hands. Within a second he is taking his students on a visual, colorful tour of the solar system. He is narrating. He shows a five minute color video clip and then several still photos. The lesson inspires the students to raise their hands and ask a lot of questions. As Mr. Bemer clarifies points or answers questions, he instantly returns to portions of the disc which supplement and review his responses.

This is a Level I application of an interactive video disc system. The teacher can move freely in forward or reverse; he can stop or freeze frame and can access information, videos, stills or photos in any order and almost instantly. The disc Mr. Bemer is using is "Astronomy." It cost four hundred dollars. He also has "The Sun," "Earth Science," and "Apollo Mission" discs. They all have narration on two audio tracks - for different class levels. He prefers to narrate this disc himself. Sometimes he uses a mixture of his own and recorded narration.

He has used the system and courseware for one year and estimates he uses the system one hundred out of one hundred and eighty days. He uses it to enhance, clarify, and complement his lessons. What Mr. Bemer likes about the videodisc system is its flexibility, the speed at which frames can be retrieved, the tremendous amount of information on the disc, and the fact that the dual audio tracks provide narration at two different levels of student capability. Also, he appreciates that the teacher has total control - he can stop for as long as he wants for questions or discussion. He claims his classes are more interesting, that students pay better attention and that discipline is not a problem.

With these discs came the Laserwrite authoring program

which allows the teacher to write programs to create complete lessons when the discplayer is interfaced with a computer. This type of application in which a computer program drives the lesson allows for interchange of video and stills on the video monitor with graphics and text on the computer, or in some cases, depending on the brand of hardware, with graphics and text overlay on the videodisc monitor. This is a Level III application of interactive video. With this authoring program the teacher can write reviews, feedbacks, branching to other explanations, tests, and can create any order of motion, grpahics and still pictures.

Mr. Bemer tried to use the Laserwrite system during the summer but was not successful. His knowledge of computer programming is limited and he found the Laserwrite program to be very complicated. If the school were to buy textbooks corresponding to the discs, Mr. Bemer would receive free instruction in the use of Laserwrite. As it is, he is on his own and finding it very difficult and time consuming.

The drawback Mr. Bemer finds to interactive videodiscs is the extensive preparation time necessary to either write a program for the Level III application or to know where all the video clips and stills are located so he can access quickly. Each disc comes with a directory, but the teacher has to be

familiar with the contents or a lot of time will be wasted in class.

No one else in the school uses the interactive video system, but Mr. Bemer hopes to get another set of equipment for his department. He has not used the discs with any higher level classes because all his classes are basic level.

Cambridge High School has another interactive video system set up in the library for the use of teachers, the librarian and students. The disc player for this set-up is different from Mr. Bemer's player in that it can play three size discs. It cost about nine hundred dollars as compared to five hundred dollars for the one Mr. Bemer has. It plays the twelve inch standard videodisc and in addition plays the eight inch music videos and the four inch compact discs. The librarian purchased this mainly for use with the music department.

Are other schools using and having success with interactive video? How effective is interactive video in terms of educational goals? What programs are available? Have they been tested? Where can you find information? How can you get started? What equipment do you need? How does interactive video compare to other teaching methods and audiovisual media? What is the future potential of interactive video? How can it be used most effectively? What subjects are best suited to the

application? Will teachers want to use it? Do they know it exists? To find the answers to these and other questions, prepare yourself for frustration and aggravation. Authors of articles on interactive video seem to speak and write a different language.

The Nebraska Videodisc Design/Production Group (no date), recognized as one of the first videodisc design/production agencies in the world, describes three levels of videodisc interactive systems. Level I consists of a monitor and videodisc player and interaction is accomplished by manually manipulating the freeze frame, auto-stop, chapter search, dual audio track, and random access capabilities of the system. The teacher shows part of a program, then can stop to discuss, and based on student responses, go to another section or segment of the disc.

Level II requires a videodisc player with a built-in microprocessor. Programs are coded on the disc and when loaded into the player are executed by the processor. This player costs twice as much as the Level I player and provides limited branching and accessibility.

In Level III, the player is interfaced with a computer and the program controls the lesson. The user input is analyzed and the computer brances to different segments according to the

responses. This system has an added cost of the computer, interface and an authoring tool with which to write the command program.

These three levels represent the kinds of interactive programs which are possible. There is also a Level 0 which is a straight linear program, meant to be played through from beginning to end. There is currently talk of levels IV, V, and VI - all generally having to do with developing similar capabilities of visuals and sound on compact discs.

What is interactive? It depends on which article you read. Some refer to how the hardware is connected and works. In other articles, it is defined by how much interaction there is between the user and the program. In general, articles written before 1985, heralded the interactive video as the greatest revolution in education in history. Level I was barely born before it was discarded as obsolete and replaced by Level III where, according to the articles, true interaction occurs. The revolution in education described by these articles has not occurred and the articles after 1985, seem to redefine the meaning of inter-activity and stress the advantages of a Level I or II system. Either is cheaper, they claim, and can be just as effective and interactive as Level III. It all depends on how the teacher prepares and conducts

the lesson.

What are videodiscs? There are two kinds. For interactive video, you need a CAV (continuous angular velocity) disc. It looks like a twelve inch phonograph record. A laser beam guided by the video signal input scores the surface during recording to create pits on the disc surface. During playback, a laser beam on the videodisc player reads the array of pits and reconstitutes them into a video image on the monitor. Because a laser beam is involved, videodiscs are also known as laserdiscs. Each videodisc contains 54,000 frames or thirty minutes of motion on a side.

A CLV (continuous linear velocity) disc contains sixty minutes but allows only crude addressability and is meant to be played from beginning to end. This type disc would be used when maximum time was needed.

What advantage does an interactive video system have over other teaching tools? Clark (1984) gives a good comparison of the various teaching media. A computer program can branch, ask questions, give feedback, and display graphics. So what is different or better about videodisc? A videodisc adds the ability to include photos, video sequences and voice or other sound. With two audio tracks, the same program can be narrated in two different languages or at two different levels of

complexity. A videodisc, unlike a floppy disc for a computer, is durable, has excellent visual quality and can mix video and still frame, can allow random access and can provide realistic simulations. Access is fast so, according to Clark, there is less disruption to learning and therefore better comprehension and retention. A Level I program can be changed as many times as the teacher wants to change it and all very rapidly.

A lecture is a passive way of learning and unless emotionally charged seldom has the listener's attention and is rarely adaptive to individual needs. Slides are valuable for visual impact and as supplements to a lesson. They are easy to produce or buy and use, but are in linear form and cannot be easily edited during a presentation without a lot of fumbling. They can also be lost or damaged easily. Videodiscs offer thousands of slides and the user has random access (Clark, 1984).

Film and videotape are usually used with a teacher's introduction at the beginning and the teacher's questions at the end. With a videodisc, sequences can be viewed at different times, in different orders and at different speeds. The user can find different parts of a film rapidly to answer questions and enhance disucssion. Videotape can be made interactive but is much slower in terms of searching than

videodisc. On a disc you can freeze frame. On videotape or film, you cannot do this with clarity for any length of time (Clark, 1984).

The main benefit of videodisc is that it combines the advantages of these other media - the color, motion and narration of T.V.; the branching, feedback, testing and data storage capabilities of the computer; the motion of film and videotape; the information of a lecture; and thousands more slides than a traditional slide presentaiton.

What are the disadvantages of an interactive video system? The major problems in education are the cost, the lack of courseware, and the reluctance of teachers to accept new technology. The cost depends on what level of interactivity you want. For about five hundred dollars, you can buy a player for a Level I or level III interactive system. Level II players are generally double the cost. Either Level I or II players can be made into Level III systems by interfacing with a computer. To interface, you need an interface board. They range from two hundred dollars to twelve hundred dollars. Most schools already have computers, so the added expense in setting up a Level III interactive video system is for the player, discs, interface and authoring tool.

What is an authoring tool? An authoring system allows the

user who is inexperienced with programming to create programs. These are menu driven, meaning that cues come onto the screen and the user makes decisions and inputs which write the program. Authoring systems range from one hundred sixty dollars to about thirteen hundred dollars. An authoring language requires programming knowledge. The user writes the program using a programming language which is compatible with the rest of the equipment. Costs range from two hundred and fifty dollars to over thirteen hundred dollars. Both tools allow the user to create programs with multiple choice, true/false questions, branching and video display. Some systems allow the user to present text on the computer and the video on the video monitor. Others allow for graphic overlay on the video monitor, record keeping and the ability to create computer grahics.

Once the hardware is purchased, you have the cost of courseware. Although most of the available courseware seems to be in science, the literature indicates a great deal is being developed now and the selection should grow. Publishers are still afraid to develop too much before being sure of a market. On the other hand, purchasers want to make sure there is enough quality courseware before buying the hardware. Teachers are still struggling with the problems of poor computer

software. There is plenty of computer software - one has only to look in any educational software directory. But, except for Tom Snyder Productions of Cambridge, Massachusetts, most educational computer software is rubbish, published rapidly with the glitter of graphics as the selling feature and of little educational value. Teachers wonder if the same will be true for videodisc courseware or if it is true now. Prices for disc courseware range drastically - anywhere from thirty dollars for one disc to $10,000 for a thirty-seven set history package.

Will teachers accept interactive video? First they have to know about it. The literature gives the impression that teachers are not only aware of the technology but prefer it to other teaching tools and are having effective instructional results using it. I suggest that if you ask one hundred teachers if they are thinking about interactive video, or know about interactive video, or use interactive video, at least ninety-nine of them will ask you what you are talking about. Teachers still have not accepted computers, partly because of intimidation with technology, but partly because they cannot find appropriate software. Interactive video has the advantage of adaptability that computers do not have. One disc can be the source for thousands of lessons. It is easy to use and the

teacher has control of the program especially with Level I applications. But teachers will have to be convinced that their job will be easier and not more complicated if they use interactive video. If teachers think the preparation time will be extensive, there is not much chance of interactive video being adopted with great enthusiasm or at all.

How can interactive video be used in the various disciplines? There is plenty in the literature to suggest uses for the classroom. Following are some examples of class uses:

1. In a geography class, a teacher could use a videodisc containing geographical forms, concepts and skills in the form of slides and video clips to support a lesson by accessing visuals instantly at any time. The time needed to find a film or set of slides or filmstrip and corresponding necessary equipment would be eliminated. On a Level III, the same disc could be run by a computer program geared to individual needs for review or tutorial help. Students could also use the disc as a research tool.

2. In a history class, a disc could contain examples of events from different time periods. With instant access to film and slides, students could see comparisons and contrasts between different eras in history. The video clips would bring the events to life and spark or enhance discussion. The

teacher could give questions to the class and let them search the disc to find the answers. Students could use the disc to illustrate oral talks.

3. In a psychology or sociology class, discs could be used to simulate conditions and events which require decision making. A class could see the results of different decisions.

4. In an English class, teachers could use stills and motion clips from movies as a basis for writing or speech projects. Narration of poetry could accomany corresponding visuals.

5. In an art class, an art disc would allow students to see many examples of artists' styles and could serve as many models for student paintings.

6. In a science class, not only could film and stills on a disc supplement lessons, but many lab simulations would be possible without setting up the lab. Students could mix chemicals and see reactions and results without it being dangerous. Where there is a lack of microscopes, the disc could be invaluable in showing microscopic slides. The disc could even take the place of a field trip.

7. For foreign language and ESL classes, the dual track capability gives endless possibilities for narration and

student practice with accompanying visuals.

But how effective would all of these lessons be using interactive video? Could a teacher create and deliver a similar lesson without an interactive system? There are not a lot of studies testing the effectiveness of educational interactive video programs. Most studies that have been done have tested the time and cost effectiveness of an interactive program in the military or health, business and manufacturing fields and deal mainly with training for specific skills. The literature does show that teachers who have used interactive video systems and programs say students learn faster, get better grades, retain skills longer, and enjoy the lessons more. One of the more recent studies of an educational disc was conducted by Vanderbilt University for Systems Impact's videodisc program, "Mastering Fractions." The results of that study showed students using the "Mastering Fractions" program scored significantly higher than those not using it. Students indicated they enjoyed using the videodisc more than any traditional tools and all of the teachers recommended the use of the program (Vanderbilt, 1986).

The literature provides examples of how teachers can create their own interactive lessons without buying expensive equipment. Interactive lessons can be created with slide/sound

equiment or using a VCR, monitor and necessary interface. Pauline (1987) gives excellent instructions in how a teacher would create the interactive slide programs and Howe (1983) explains how to develop interactive videotape lessons. The interactive slide system allows use of different sequences, text, graphics, sound, questions and feedback and can store and analyze student data. The disadvantage to this system is that it cannot access specific points on the audio tape and cannot return to a designated point. However, slides can be randomly accessed. Because of these drawbacks and the probability that the cost of the authoring system or language, plus the interface and special slide/sound projector would now equal or surpass the coast of a videodisc player for a Level I application, it seems that unless the teacher wants the experience in creating the program, that the teacher would get more use and have greater flexibility in lesson preparation with a Level I player.

The interactive videotape is slower than interactive videodisc but where speed and branching are not critical, it might be useful. The greatest value of either an interactive slide show or interactive tape lesson would be if the students were involved in the creation of the programs. Secondary students are quite capable of making videos, taking slides, and

writing computer programs. Lessons have much greater relevance to the students if they are involved in creating them. This would be true, interactive learning.

If you were to purchase a system, where would you put it? One of the major problems with interactive videodisc lessons is that they are usually shown on a monitor or T.V. screen. With an entire class, which is what most teachers have to work with, this is an impossible situation. Except for five or six of the students who are next to the monitor or T.V., no one else can see properly. To be of value, the systems and teachers need to use a large wall monitor or an overhead projector with a crystal unit to give a large enough image for the entire class to see. For schools unable to afford many interactive systems, the best solution would be to designate one room which has a wall monitor and which could be used on a sign-up basis as the interactive video room.

What are other possible placements for the interactive video systems in the schools? For teachers like Mr. Bemer, who would use the system almost every day, it makes more sense for it to be in his room. Schools with large enough media centers might provide small cubicles where students could use the system as they do now with VCR's, computers and typewriters. It would be convenient to have an interactive video room as

schools now have computer rooms, but at a cost of more than one thousand dollars for a set-up of interface, disc player, and monitor for a level III, individual system, this is not likely to happen soon.

What are the future implications for interactive video in education? An interactive video system has many advantages over other teaching tools. It is a convenient way to coordinate and enhance existing resources. It combines many pieces of equipment into one. It is easier to use than a computer, the disc is almost indestructible, and the system can do more than a computer. It has tremendous storage capacity. It allows random access to any frame. It allows the user to operate in slow, fast, forward, and reverse. It can be used with individuals or groups. It can be used to enhance or supplement a lesson or to create many different lessons. Level I seems best suited for the traditional classroom. The teacher can adapt the lesson quickly to each different class. Level III, in which a computer program has to be written, seems ideally suited to the needs of individuals or small groups. Level II is a more expensive and less flexible.

When a lot of media material is to be stored, when a high degree of interaction is required or desired, when a teacher needs to respond to different needs or skill levels, when

training requires simulation on dangerous or expensive equipment or in dangerous situations, the interactive video is the most effective tool of instruction.

But back to the question - do teachers really need this? Teachers do not need fancy equipment to keep track of student records and accomplishments, nor to analyze scores, nor to ask questions, nor to lead discssion, nor to create different lessons. So why interactive video? What teachers can't do is instantly produce the visuals and sound that an interactive videodisc can do to support or supplement the lesson. The teacher cannot do the rapid visual comparisons that are possible on interactive videos, nor unfortunately, can most teachers keep the students' attentions the way an interactive system can. Interactive systems and programs need more evaluation. Most studies are based on teacher and student response to opinion questions. The few controlled studies that are available are described and explained mainly by the companies who developed the programs. There is the problem of compatibility of equiment parts. Any teacher thinking about purchasing equipment needs to ask careful questions about compatibility of one piece of equipment to another and of the discs to the equipment. There is no industry standard for the hardware or software.

Finding quality discs could be a problem and without these the equipment is useless. As for costs, they have come down for both discs and hardware. For three to four hundred dollars, you can buy an interface kit with an authoring system or language and manuals. John Phillipo of the Merrimack Educational Center in Massachusetts explains that a teacher can buy a disc such as "The Cell Biology" disc for $400 or buy separate traditional equipment and material to replicate what is on that disc at a cost of about $10,000.

Before teachers will make much, if any, use of interactive video technology, they need to know about it. In-school workshops and demonstrations would be the best way of introducing and explaining the possibilities of the systems. Teachers who try to read the complicated and jargon-filled literature will probably be discouraged and antagonized. Archival (reference) discs and the Level I systems appear to have the greatest possiblity of being accepted by teachers. The equipment looks like their familiar videotape equipment and is as easy to operate. The possibility of sequencing visuals and text is endless and the number of different possible lessons is infinite.

ANNOTATED BIBLIOGRAPHY

Azia, Leslie A. "Case Studies Prove Effective Benefits of Interactivity," E-ITV, September, 1986, 20-24.

This article gives examples of cost effectiveness, in terms of money and time, of interactive video programs in the military, in medicine and in business.

SUMMARY:

The main benefits of interactive video are efficient use of time and resources. Following are five examples. Through an interactive simulation, servicemen can experiment with a six million dollar missile without risk of injury to themselves or damage to equipment. Raytheon Service of Kansas City used interactive video to simulate an airplane and saved millions of dollars in training pilots. The Center for Disease Control teaches doctors how to investigate hospital epidemics and allows them to observe diseases not yet encountered. Chrysler Corp. used interactive video to conform to requirements of OSHA for hazard communication training and cost per worker was less than twenty dollars. Point of information and point of sale kiosks in banks, malls, stores, and airports dispense information in entertaining ways and generate sales.

Bemer, Jim (pseudonym). Personal Interview, Cambridge (pseudonym) High School, September 30, 1987.

This was a personal interview with, and observation of, Mr. Jim Bemer, Science Department, at Cambridge High School. Mr. Bemer explained how, why, and when he uses interactive video with his classes.

SUMMARY:

Mr. Bemer finds the flexibility, random accessibility, tremendous amount of information and visuals, and the ease of use to be the greatest benefits of an interactive video system. He finds that the programming for a Level III program and the preparation necessary to find the specific frames on a disc for a Level I lesson take a great deal of time.

Branch, Charles E. et al. "Producing a Simple Interactive Videodisc," E-ITV, January, 1987, 20-21.

This article describes the development, by the College of Veterinary Medicine at Auburn University, of an inexpensive interactive videodisc on the auscultation of dog heart sounds.

SUMMARY:

The disc was developed to help students practice listening to animal sounds without requiring the presence of the animals. It contains a simple menu system, recordings, submenus for individual recordings, and a feature for comparing recordings. The user can see a slide and hear voice descriptions and the recording of the sounds.

The cardiology students were very receptive. They said it helped correlate the animal cardial cycle with the sounds. This demonstrates that simple and inexpensive lessons can be useful. The cost for the videodisc tape was eighty dollars. The check disc cost three hundred dollars. The success of the production of this disc led to external funding for the development of more complex lessons and the hope is that a consortium of schools will be established to develop, evaluate and distribute interactive video lessons to help save costs.

Brodeur, Doris R. "Interactive Video: Fifty-One Places to Start - An Annotated Bibliography," Educational Technology, May, 1985, 42-47.

This is a comprehensive annotated bibliography on interactive video. It covers literature from 1982-1985, from ERIC and the Microcomputer Index.

SUMMARY:

This bibliography annotates articles on the hardware, software, features, advantages, and limitations of interactive video. It includes articles on projects, applications in education, business, medicine and the military, on designing discs, and on experiments comparing traditional lectures with interactive videotape lessons. It includes descriptions on applications to training programs in diverse fields, on different levels of interactivity and on the role of instructors. It annotates articles comparing interactive video with other audio visual equipment and methods, also articles describing current programs and possible uses, uses of authoring languages and systems and examples of courseware.

Chambers, J. "Interactive Video: A Genuine or Imagined Potential," British Journal of Educational Technology, January, 1987, 21-24.

This article discusses the future effect and cost of videodisc in schools.

SUMMARY:

The author uses the "Vincent Van Gogh" and the "Leonardo Da Vinci" discs to answer the following questions. Is interactive video an advantage over conventional teaching aids? Is the manufacture of videodiscs viable for software companies? Will the cost be low enough for schools?

For overall definition and color of picture, the advantage is with film and books, but interactive video has the advantage of accessibility and dual soundtrack potential. The manufacture of discs for schools is not yet viable for manufacturers. Developers need to test the market at schools.

Char, Cynthia. "Classroom Use: Some Field Tested Ideas - Video Discs in Art and Language Arts," Classroom Computer Learning, January, 1987, 50,54.

This is a description of Bank Street College's Interactive Video Project which studied the use of archival videodiscs in an elementary school art program and a videodisc editing system in fourth and sixth grade story composition classes.

SUMMARY:

In the art class, frames were used as a basis for still life drawing, as introductions to a unit, as examples of suns, moons, and human figures or for students to use as supplements to oral talks.

In the language arts classes, segments of movies were used as a basis for writing stories about characters and for students to construct their own video story using various sequences from a movie. The students had to determine structure and logical connections of sequences.

Clark, Joseph. "How Do Interactive Videodiscs Rate Against Other Media?" Instructional Innovator, September, 1984, 12-16.

This article describes the potential of interactive videodisc in educational settings, how it works and how it compares to other educational tools and methods.

SUMMARY:_

Interactive videodisc provides high quality photos, rapid random access to frames, low cost duplication and realistic simulation. A videodisc looks like a twelve inch record and has a laser etched surface which is read by the laser during playback. A disc contains 54,000 single frames or thirty minutes of motion on each side of a CAV disc. There are four different models of players: industrial models which allow searching, scan, fast, and slow control; Level II players which have microprocessors and are run by a program on the videodisc; players that can only be played by a computer; and comsumer models that don't allow searching. For interactivity, discs need to be the CAV type and the user needs a monitor and, for some players, a computer.

Videodisc combines the advantages of other teaching mediums and eliminates the disadvantages. Computers can't generate photographic images and have limited memory. In lectures, listeners retain about eight percent of a ten minute lecture and about twenty percent of a fifty minute lecture. Slides are good visual aids but are linear and hard to edit. Films provide passive learning and need to be reinforced with some kind of other material. Videotape is easy to use and portable and can be used interactively, but has slow response. Videodiscs focus and direct the student according to his performance and input. The videodisc has random access and is almost impossible to damage. Videodisc has a fast search time and the quality of the image is good.

The obstacles to the use of interactive videodisc in schools are cost and lack of acceptance by teachers.

Cohen, Vicki Blum. "Interactive Features in the Design of Videodisc Material," Educational Technology, January, 1984, 16-20

This describes the features of interactive video which can improve the quality of interactivity in computer-controlled videodisc projects.

SUMMARY:

The combination of video, still frames and computer based instruction in interactive software design must promote an atmosphere of active learning. Software design should include the following features: students should be able to choose their own sequences in the program; students should have control of options so they can review, exit, or take a test as necessary; feedback should locate error and inform student how to correct it; information should be broken into small

units; and content should be flexible enough for several different kinds of users.

The quality of the program, not of the hardware,is what is important.

Comcowich, William J. "Expert Systems: A New Era in Videodiscs," E-ITV, August, 1987, 23-25.

This article explains why the videodisc industry has not expanded as fast as had been predicted and what the new era in videodisc technology will be.

SUMMARY:

Most corporations and educational institutions have prolonged the decision to purchase equipment. The lack of courseware has discouraged buyers. The new era will start as videodisc publishing increases and there are more published reports of successes of interactive programs.

The industry needs to produce "taskware" - an expert system merged with artificial intelligence. This kind of system will assist in doing a job, not just teach how to do it. This new system will assist decision making and problem solving in business. Technical and procedure manuals will be replaced by these systems which will diagnose and analyze.

There will be a new person called a knowledge engineer who will design and develop expert system software. There will also be artificial intelligence programming writers, and managers of training and video departments to assemble, organize and communicate a body of knowledge.

Comcowich, William J. "The Ressurrection of Level II IVD," E-ITV, August, 1987,29-30.

This article describes the return by several companies to the use of Level II interactive systems.

SUMMARY:

The relatively low cost, simplicity, reliability and portability open sales and marketing to Level II applications. Most companies developing generic discs for training are issuing Level II versions which can be viewed on Level II or III systems.

In one projected plan to train over twelve thousand employees, management will save seventy-five percent of the cost of a Level III system by using a Level II system. In another case, a pharmaceutical company gives its salesmen a Pioneer LCV3000 Level II player to carry with them. It is easy to use and easily portable.

Ebner, Donald G. et al. "Videodiscs Can Improve Instructional Efficiency," Instructional Innovator, September, 1984, 26-28.

This article describes the use of an interactive video program used to teach servicemen how to give intramuscular injections.

SUMMARY:

This research was conducted at the Army's Academy of Health Science, Fort Sam Houston, Texas. The intramuscular injection task was chosen because it was an observable and measurable task, was taught to large classes bi-weekly, required more than forty instructors and had a high failure rate. Conventionally it was taught in classes of forty-two with three teachers per class. The course had four phases: 1) a videotape introduction and discussion; 2) demonstrations and questions; 3) practice in pairs; and 4) mandatory study hall for review and discussion.

The research team randomly selected seventy students from the entering class and assigned twenty-eight to the experimental group and forty-two to the control group. The control group was taught in the conventional way, while the experimental group was introduced in the conventional way but used interactive video to enhance the other three phases. The test was given two days after training and again seventeen days later.

Results showed the interactive video group saved over three hours. Differences in the first testing scores were not significant, but in the delayed test, the difference was. Seventy-five percent of the interactive group were successful while only fifty-nine percent of the control group were. Students and teachers were more complimentary towards the interactive video experience.

"Effectiveness of Mastering Fractions: A Videodisc Course From Systems Impact Inc.," Video Monitor, May, 1986, 18.

Systems Impact Inc. describes the evaluation of "Mastering Fractions," a thirty-five lesson videodisc course for upper elementary through twelfth grades.

SUMMARY:

The course was tested at five sites, in grades five to ten. The study compared two classes using ten lesson programs of basic fraction skills. One used

"Mastering Fractions," and the other used the textbook, Mathematics Today by Harcourt, Brace and Jovanovich. The skills taught included writing fractions from pictures, multiplying fractions, multiplying whole numbers and a fraction, and adding and subtracting fractions.

Pre, post, and maintenance testing showed that the videodisc classes did better. Students perceived greater gain with the books, but felt the videodisc had greater relevance. Results showed ninety percent of all students using "Mastering Fractions" showed mastery in seven weeks.

Emmens, Carol A. "Videodiscs: A Future in Educatin?", SLJ School Library, December, 1985, 44.

This article discusses why interactive video technology has not yet made an impact on public educatiow.

SUMMARY:

Videodiscs are costly and difficult to develop. There is also a problem of non-compatibility of hardware. An interface board is required to hook up a player to a computer for a Level III system. Pioneer's 6000 has a built in port, but others can't hook up at all. The user needs to know the player, computer and interface before purchasing discs.

The future is looking better. Many audio-visual companies, T.V. stations, and publishing companies are exploring the markets. WICAT in Orem, Utah has discs for French and reading. Digital Equipment Corp. is testing math in Lexington and Lynfield, Mass, and Bank Street College is active in research and development. This is only the tip of the iceberg.

Ferralli, Anthony and Kathryn. "Interactive Video: A Tool for Changing Times," Media and Methods, January/February, 1986,10-13.

This article explains how interactive video can solve school and industry problems. It includes a list of videodisc publications, interest groups and suppliers.

SUMMARY:

Research shows that with interactive video students learn faster, retain more and enjoy the lesson more. Interactive video allows the use of simulated learning

experiences which would be dangerous or difficult. It makes sense economically. It doesn't make sense to purchase twenty slides from NASA for twenty dollars, when you can purchase the "Video Disc Shuttle Downlink" program for forty dollars and have over one thousand slides and fifty minutes of video.

Because students are involved in the programs, it leads to analytical thinking anddeductive reasoning and decision making. The greatest advantage of videodiscs is that they can all be made interactive.

Teachers have the opportunity to set standards. Disc developers need their input about programs. Will future discs be self-contained courses or databases? Interactive video allows great creativity with which to meet current and future neeeds.

"Free Videodisc Players and Quantity Discounts," Teaching With Videodiscs, July, 1986.

This article describes the discount plans offered by Systems Impact, Inc.

SUMMARY:

Systems Impact, Inc. offers a free videodisc player or seven hundred dollars in credit toward future purchases of videodiscs for every seven "Core Concepts" discs purchased.

Gayeski, Diane et al. "Getting Into Interactive Video Using Existing Resources," E-ITV, August, 1987, 26-28.

This describes the resources necessary to support interactive video, how to make use of what you have, and how to avoid spending a lot of money.

SUMMARY:

You need: 1) video production equipment; 2) a video playback device - this can be an industrial random access one half inch or three quarters inch player recorder or videodisc player; 3) a computer for branching capabilities or a Level II disc player which contains a microprocessor which can read encoded programs on a disc; 4) authoring programs to command the computer; 5) a script writer to develop lessons using branching; 6) knowledge about the audience to determine kinds of questions to insert; and 7) interactive thinking skills.

You can produce programs with a random access tape player and hand held search controller for about three hundred and fifty dollars. If you have a computer,

monitor and a tape player, you can buy an interface and authoring system and hook up equipment to create an interactive system for under two thousand dollars.

Glenn, Allen D. "Videodiscs and the Social Studies Classroom," Social Education , May, 1983, 328-330.

This article discusses the use of interactive videodiscs in social studies classes. It Describes a videodisc, an interactive system, four types of classroom applications, how interactive video will affect teachers, and what the future holds.

SUMMARY:

A videodisc can store music, pictures, still frames and has two separate sound tracks. It is played on a turntable connected to a T.V. or monitor. Each side of the disc contains 54,000 frames or thirty minutes of motion. A laser beam reads a track of information coded on the disc, but there is not contact, so there is no wear and tear on the disc. The disc can be accessed randomly and is more flexible than film, T.V. or videotape. The user can present motion in varied order and speeds and as stills. When the player is interfaced with a computer, a computer program can control the sequence of presentation.

There are four possible uses of interactive video for social studies classes: 1) The films and slides on the disc can be used to support a lesson; 2) The disc can be used as a tutor for a student needing extra help; 3) Simulations on the disc can make abstract more concrete and can be helpful when equipment can't be brought into class; 4) The disc is a storage device and can be used as a resource source.

The conclusion is that interactive video will offer students more opportunities to understand about the world. Development efforts are lacking in social studies programs, but as costs go down, more discs will be available and they will help to improve the teaching of social studies.

"Greatest Achievement Gains Tied To Videodiscs," Teaching With Videodiscs, September, 1986.

This article describes the effectiveness of the videodisc programs - "Mastering Fractions" and "Mastering Decimals and Percents."

SUMMARY:

With a similar population of students, curriculum, and teachers over the last five years, the 1986, scores on the SRA General Ability Measure placed the sixth grade in the forty-fourth percentile, but in the sixty-fourth percentile on the math subtest. This represented a twenty-five percent gain over the previous year's class.

Information was reported by the teacher and principal from Mt. Eagle School in Fairfax County, Virginia. This study had no controls. The principal and teacher related the reasons for success to the video programs. They said the lower and higher achieving students succeeded equally, were more motivated and behaved better. The teacher tested the students using the book test and all students passed. The teacher concluded that the students had transferred skills from one instructional setting to another. Students and teachers were enthusiastic about the program.

"Hardware: What You'll Need to Get Going," Classroom Computer Learning, November/December, 1986, 30.

This describes what hardware the user needs for the three levels of interactivity.

SUMMARY:

For Level I, the user needs a player able to play both CAV and CLV discs with chapter stops and picture stops, a remote control unit, and an outlet for hooking up to a computer. Standard Level II players cost about twice that of Level I players. They are not always compatible for all Level II discs. Some can be used with a remote control as with Level I or hooked to a computer for Level III interactivity. For Level III, the user needs an interface card, and needs to know what Level III software or authoring system he will be using. Each program is designed for a specific interface and player.

Some of the newer videodisc players are built with an RS232 port. If the computer has this port, as the Apple IIg has, or has a serial interface card for a printer, then the player and computer can probably be connected without another interface. For large classes, teachers need large screen monitors. With Level III applications, the user often needs two monitors - one for the computer output

and the other for the video output.

Hawthorne, David L. "Eliminating Interactive Barriers," E-ITV, September, 1986, 15-18.

This discusses reasons why interactive video still faces such resistance and why the dream of the technology has not been realized.

SUMMARY:

Before anyone had a chance to get used to Level I, there was already Level II and III. Now there are discussions of IV, V, and VI. But one encouraging trend is that people seem to be back to rediscovering the use of Level I and II and focusing on results here before leaping forward. People are also being encouraged to start with interactive tape before going to discs.

Another problem in the interactive video industry is that the developers seek the market of the huge companies and the military, where the money is. The needs of the majority are ignored. The jargon in the field is another problem. It makes interactive video seem much more complicated than it is. People also report that there is stress involved in the use of a videodisc system. It comes from considering all you want to do and not having enough money, nor time, nor knowledge to do it.

A report in the Videodisc Monitor shows the future of videodisc to be not as explosive as had been thought. Point of purchase and point of information kiosks in malls, banks and real estate offices can provide information or demonstrations and justify installation of the system, but while interactive video has enormous potential in education, government agencies, museums and visitor centers, the budgets of these agencies will prevent them from using it. The Monitor's study shows that industrial, military and medical training programs are most likely to use interactive video because it has proven to be more effective than traditional methods, is cost effective and meets their needs.

Hawthorne, David L. "How Far Should the Concept State Go?", E-ITV, December, 1986, 14-19.

This is Part One of a nine part series on the production of interactive videodiscs. This part discusses the original concept or idea for a video disc.

SUMMARY:

The ideas or concepts come from anywhere - from the client, the supplier,

the State Legislature, or out of a problem. At this stage, common problems involve trying to fit a video to every problem, the expense, lack of thorough explanation of the concept and recruiting the team members. A good concept includes the need to practice the material, the need to measure mastery, and the need of individuals to progress at different rates.

The team must include a media producer, software person, subject matter expert, and a management person. The team needs to discuss the basic idea, objectives, and curriculum requirements. Everyone involved needs to examine the outline and be involved in estimating the cost.

Hertlein, Dr. Forest. "Program Flexibility," Teaching With Videodisc, September, 1986.

Dr. Hertlein lists the classes using Systems Impact's "Core Concepts in Mathematics" in the Muketteo School District in Washington.

SUMMARY:

The "Core Concept" math courses are being used for individuals and in small and large groups in the following classes: English as a second language, remedial assistance - Chapter I, junior and senior high regular math classes, special education classes, regular elementary classrooms and in the gifted classes.

Hose, Peter. "Adopting Interactive Videodisc Technology for Education," Educational Technology, July, 1987, 5-9.

This article reviews literature dealing with the educational potential of interactive video, how the technology can be developed and the need for evaluation of instructional effectiveness of interactive video.

SUMMARY:

Limited data exists concerning the effectiveness of interactive video as a teaching medium and much of the available information concerns training simulation in military or manufacturing settings where it has been found to be cost and instructional effective. There is a need for more comprehensive

evaluations related to school environments. Researchers need to compare the use of interactive video and traditional teaching methods.

One major problem in the development of educational discs is the cost of the design and production. Generic discs which contain a variety of material could be the answer to providing video at a reasonable cost. Teacher acceptance is the other problem. The greatest potential of interactive video is to provide an individual learning system, but educators need a great amount of high quality courseware for a diverse student population and need to determine the type of situations and learning best suited to interactive video.

Howe, Samuel F. "Interactive Video: Salt and Pepper Technology," Media and Methods, January, 1985, 8-15.

Howe introduces interactive video and describes what it is, how it works, how you can do it yourself, and some available programs. The article includes a comprehensive interactive video resource guide to books, developers, discs, tapes, workshops and addresses.

SUMMARY:

The joining of video and computers create a technology with more power than a computer, more impact than film and more information than a textbook. Interactive video has high quality graphics and imagery and can include a wide variety of articles and scientific and historical material and can add taped audio to software. There are three levels of interactivity. Level I uses a VCR or videodisc player and monitor. The user manipulates the controls. In Level II, you need a videodisc player and monitor. The player has a built in microprocessor and a small amount of memory. This is the only videodisc format in which a short program is stored on the disc. The code runs the program. Level III uses either a VCR or disc player linked to a computer and monitor. In Level III, you need an interface. The computer program analyzes user input and controls branching and responses.

The videodisc is more versatile than a video cassette. It has 54,000 frames, dual audio tracks and random access. The cassette has only one usable audio track and is a linear storage medium, but the cost is much less for a cassette and schools already have VCR's. With this available equipment teachers can make

their own interactive tape system. To create a Level III interactive tape system, you need a VCR, monitor, computer, and interface (not all VCR's can be used). The user can buy preprogrammed software or create an original lesson as a class project. First the user writes a program to access segments on the tape, then divides the tape into segments. Segments can be shown in any order. The signal code is laid down on the second audio track. A disk, which comes with the interface, allows you to do this.

Howe, Samuel F. "Interactive Video," Media and Methods, November, 1983, 9-11.

Howe describes how to adapt videotape for an interactive video lesson.

SUMMARY:

To transform a videotape into an interactive video lesson, first record a signal track on the videotape's second audio channel. This track allows the computer to count frame numbers. Then look at the tape and mark the start and stop points of segments. Frame numbers and cue names are stored in a table. This is done with software which comes with the interface. The third step is to write a program in BASIC or Super PILOT which will command the computer to search and play segments. Another alternative is to use a video authoring language to write the program.

Interactive video is most effective with small groups and gifted students. The creation of an interactive video lesson can be done as a class project - part of the class could produce the video and part could write the computer program. Text or questions can be inserted into the video tape or user could present the video then have questions appear on the computer monitor.

"Interactive Video On a Shoestring, " Instructional Innovator, September, 1984, 29,40.

This article describes an interactive videotape experiment conducted by science teacher, Arthur Jennings. It also describes how normal videotape can be made interactive.

SUMMARY:

Mr. Jennings divided four hundred and ten students into three groups. In group I, four classes watched a normal linear video about the control of insects. In category II, four classes did the same, then discussed the film. In group III, five classes saw an interactive videotape which stopped to ask questions about the material. If a student gave a wrong answer, the tape returned to a review segment. On a quiz the next day, the interactive classes rated substantially higher than the other two groups. Almost one hundred percent of the students in the interactive group paid attention; only five or six from the other groups paid attention.

Using a Panasonic interactive system, questions were inserted into the program and the tape was electronically marked for advancing, rewinds, and stops. The Panasonic system includes a Panasonic computer, a text writer for entering the written information, a handheld keypad and printer to record information on student performances, and a VHS player. The advantage to developing this kind of tape is that students can write their own programs and create the tapes with a VCR, Camera and editor.

Ives, Robert. "Videodiscs and Computer Literacy," Teaching With Videodiscs, September, 1986.

This explains the expansion and course title changes in computer literacy curricula in public schools.

SUMMARY:

With new technologies, computer literacy courses are being changed in content and title. Now, courses or curricula are called "technological literacy," "information technology" and "informational sciences."

Jegi, John. "A Math Disc That Offers a New Equation for Learning," Electronic Learning, January, 1987, 45-46.

Jegi describes the content and design of a math series called "Core Concepts" by Systems Impact.

SUMMARY:

This Level I series is designed to be used by an entire class and has three parts - "Mastering Fractions, " "Mastering Decimals and Percents" and

and "Mastering Ratios." It is meant for grades upper elementary to secondary. It includes teacher manuals, answer keys, tests and remedial exercises.

The disc design features a video presentation of a particular skill. The narrator then presents problems and asks students for answers. The next problem in the student workbook and on the video screen gives immediate feedback. The teacher can branch, give a quiz, or review. The motion, graphics, highlighting and sound effects keep the students' attention.

Jonassen, David H. "The Generic Disc: Realizing the Potential of Adaptive, Interactive Videodiscs," Educational Technology, January, 1984,, 21-24.

Jonassen explains how the development of generic discs could be a solution to the conflict between the educational design potential of interactive video discs and the interest of educational publishers.

SUMMARY:

The combination of videodisc player and microcomputer represents the highest level of interactivity. It offers the flexibility to adapt the presentation, sequence and mode to meet the user's needs, knowledge, intelligence, and cognitive styles. But there are two problems in the production of courseware. First, most of the programs cannot be generalized to local conditions or instructional situations. Second, development costs are extremely high - about $100,000 for the most basic program with only limited interactivity and adaptation.

Publishers want to see series of programs. Pilot programs don't show enough of potential and the expense of producing adaptive videodiscs and fitting discs to various computers and players is too great. The solution is the generic disc. Let local teachers program generic content discs to meet their own needs. Generic discs could contain an introduction, variety of content sequences, review and menu. Content could be presented in different kinds of sequences. The high cost of developing interactive design would be eliminated. The generic disc could sell for thirty or thirty-five dollars.

The user would need a disc player, computer, interface and authoring system. PILOT Plus or INSIGHT Plus will work with most players and computers.

The system allows the user to develop the program and have full control of the content and allows for learner control, remediation, grade or curricula adaptation.

Kalowski, Phyllis et al. "A Directory of Archival Videodiscs," Classroom Computer Learning, January, 1987, 55.

This article lists and describes twelve educational videodiscs and describes the intended audience, contents, prices and necessary equipment.

SUMMARY:

"BioSci" and "Life Cycles" includes thousands of still images and several motion sequences (no audio) for secondary through college. The cost is $495. "College, USA" helps students select a suitable college and includes information on one hundred and fifty colleges. A three year subscription costs $475 and includes rental of a videodisc player. "Encyclopaedia of Eastern Pacific Sea Life" is a Japanese disc which requires knowledge of Japanese. It costs $199. "The Knowledgedisc" is text only. It is the complete Grolier's Encyclopedia. It costs $89.95. The "Living Textbook Series" contains several science discs with still, motion clips and audio. Each disc is $400. "National Air and Space Museum Archives" is a set of three discs containing the history of aviation and space exploration. Each disc is $46.50.

"The National Gallery of Art" contains the history of the National Art Gallery and a tour of over one thousand slides. It costs $95. "Profiles in American Art" is a set of twelve video discs containing ideas and works of American artists and sculptors. Each disc is $95. "The Video Encyclopedia of the Twentieth Century" is a set of thirty seven discs covering events from 1893-1984. The price is $10,000. "The Vancouver Disc" is one of a series of discs describing cities in North America. Each disc is $59.95. "The Videodisc Music Series" is a set of four discs containing symphonic, orchestral, chamber and vocal music with stereo sound and video of performances and scores. The cost is $295 for the set. "Vincent Van Gogh" covers Van Gogh's art and life.

Kalowski, Phyllis et al. "Facts about Interactive Video,: Classroom Computer Learning, November, 1986, 26-27.

This article defines the terms used commonly in discussions of interactive video. It describes the different types of players, discs and the levels of interactivity.

SUMMARY:

Twelve inch videodiscs come in two formats. CLV (continuous linear velocity) discs give sixty minutes of video per side for noninteractive programs. CAV (continuous angular velocity) discs allow thirty minutes of motion per side and allow for interactivity. The CAV disc stores 54,000 frames on one side and both sides have two channels of stereo sound.

There are four levels of interactivity. Level zero discs are not interactive. They contain no index nor built in chapter stops. They are played from beginning to end. Level I allows the user to retrieve single frames rapidly, to move forward, back, slow and fast. There is no internal programming and there is no connection to a computer. The user needs a monitor or T.V. a remote control device and a videodisc player. Level II requires a videodisc player with a built in processor which decodes limited programs on the videodisc. The student uses a remote control device with keypad to interact with a Level II program which allows limited branching. When a videodisc player is connected to a computer and controlled by a computer program, it becomes a Level III system. For this level of interactivity, the user needs a player, computer interface, monitor, computer, and software to control the disc.

Kearsley, Greg P. et al. "Design Factors for Successful Videodisc-based Instruction," Educational Technology, March 1985, 7-13.

After giving examples of outstanding videodiscs in business, the military, education and medicine, the article describes design factors of effective videodiscs.

SUMMARY:

Available evidence suggests interactive video is a highly effective instructional medium for all types of educational and training applications. Students have better scores with less time required. The branching structure is a critical factor in good videodisc design. The level of interactivity determines the kind of branching, feedback, review and questions possible.

Level I has no programming, but allows manual branching to locations. Level II has branching for answer sequences or menu selections. With a Level III system, the computer is interfaced with the player and allows for storing responses and generating graphics.

The second important factor is visual design which directs attenion and stimulates interest. For still frames, design needs to avoid clutter, have small type, clear graphics, and visuals instead of text whenever possible. Information on the disc must be organized and easily accessible, preferably with an index, and must allow for student control of pace and type of instruction.

Larsen, Robin A. "Interactive Video: Designing Your Own," Media and Methods, May/June, 1987, 8-10.

Larsen describes the changes in the use and cost of interactive video over the last year.

SUMMARY:

Authoring software is now easy to use and inexpensive. Players are affordable and most schools have purchased components of interactive video. Workshops and conferences have spread the word. Players are as low as six hundred dollars. By the end of 1987, an estimated 35,000 schools will own equipment. Kits now for sale at three hundred dollars include an interface, videodisc, authoring software, program manual and a sample lesson.

Most interactive video is on Level I. Teachers use generic (reference) discs to creat new lessons daily. Teachers could also shoot their own footage and write their own software text and then have it pressed by a disc company as Annette Sherry of Massasoit Community College is doing. She is borrowing a Sony videodisc player and monitor. She is renting the "National Gallery" videodisc for eighty-nine dollars for the year from the Smithsonian Institution's Pilot Interactive Learning Center. She estimates that the fee for pressing the disc will be about six hundred dollars. It will be a Level III disc.

"Laserdisc Technology in New Jersey Class Lets Students Get the Picture," T.H.E. Journal, September, 1986, 52-56.

This article describes the results of the use of the "Astronomy" and "Earth Science" laserdiscs, from Optical Data Corp, in a Glen Ridge, New

Jersey High School.

SUMMARY

Rita Henry, a science teacher, set up an interactive video work station with an Apple IIe, Optical Data's VAI II interface, the Laserwrite authoring software, the "Astronomy" laserdisc, a Pioneer Laser Videodisc player and a thirteen inch video monitor. She created lessons with the Lawerwrite software and found that the students tuned into class more, that they understood concepts better and got better grades. The principal felt that the interactive video system bridged the gap between students with different abilities.

"Level I Efffectiveness Recognized," Teaching With Videodiscs, September, 1986.

This article summarizes the report of the Artificial Intelligence Research and Development Unit of Utah State University which strongly advocates Level I discs for public schools. It describes the three levels of interactivity and explains why the Unit prefers Level I for education.

SUMMARY:

Level I discs require no computer, Level III discs do. A Level II program uses a program on the disc and a microprocessor inside the discplayer. Utah State researchers favor Level I discs because they can be used with individuals or small and large groups, are less expensive and are as effective as Level II and Level III discs. The problem is in developing Level I discs. The discs should stress the prevention of errors rather than remediation of errors and developers need to emphasize the quality of the program and not the power of the equipment.

Levin, William. "Interactive Video: The State of the Art Teaching Machine," The Computing Teacher, September, 1983, 11-17.

This article gives an overview of developments in interactive video to 1983. It includes descriptions of hardware, federal programs to promote courseware development, use in the classroom, available discs and suggestions on how to get started. It lists several manufacturers or developers to contact for help.

SUMMARY:

Interactive video combines the feedback and branching capabilities of the computer with the color, sound and motion of the T.V. The user needs a videodisc player and videodisc and for most versatility a computer and interface device. Pioneer and Magnavox manufacture consumer models of videodisc players. Industrial models use internal microprocessors and can accept simple preprogrammed instructional commands which are coded on the disc. These are the most expensive players at about twenty-five hundred dollars.

There are three levels of interactivity. Level I allows random access and uses no computer. Level II uses memory in the industrial player and the code on the disc which allows more complex branching. Level III links the computer to the disc player and allows the generation of computer graphics on top of the disc images.

In 1982, the Division of Educational Technology of the U.S. Department of Education began the "Videodisc Microcomputer Project" to develop a network of schools to implement interactive video projects. Schools had to have computers and videodisc players, but received discs, an authoring system, and interface units.

Many of the early discs were for military or industrial training purposes or marketing services, but the technology has great educational significance. It can liberate teachers from frustration, but how it is used depends on the teachers. The best source for information and training is the Nebraska Videodisc Design/ Production Group.

Lippke, James A. Ed. "Early Planning - Finding answers to All the Questions," E-ITV, February, 1987, 26-31.

This is the second part of a nine part series on interactive video design. E-ITV asks a panel of experts to discuss early videodisc planning stage.

SUMMARY:

The early planning stage is the stage before the final plan is fixed. The Level of interaction is usually decided before the content, but content can strongly suggest level. The hardware and level determine the authoring system options. For public schools, there really are only two choices - the Apple IIE

or the IBM PC and Level I or III, with Level I being the cheapest.

The early planning stage involves a needs analysis, determining objectives, course content, audience, time and budget.

Lippke, James A. Ed. "Finally, the Final Plan," E-ITV, March, 1987, 35-40.

Part three in this nine part series discusses the final plan in the development of a videodisc.

SUMMARY:

There is no common definition of what the final plan is or when you get it, except that it is what you have before you start scripting. Usually two plans exist - the business plan and the content plan. Most plans describe the instructional design or strategy, personnel, budget, hardware, authoring system or software, dates of expected finish, some kind of flow chart or map which identifies objectives of the lessons, the intended audience, the organization of time and of production of stills and video, and level of interactivity.

Lippke, James A. Ed. "Interactive Videodiscs: Entering the Mainstream of Business," E-ITV, August, 1987, 12-27.

This article describes current uses of laser discs and discusses future trends, where the market is, IBM's InfoWindow and its probable effect.

SUMMARY:

Interactive video has not yet begun to revolutionize education and training, but has proven itself as a cost-saving, effective training approach and as an effective information system. In 1987, there is likely to be a thirty-five to forty percent growth in systems over 1986. The average cost per unit is sixty-five hundred dollars and about fifty-three thousand units are being used. Next year about$450,000 will be spent on developing hardware. Industry leaders give the re-entry of IBM into the market, the Army Eids contract, the growing quantity of generic courses, the multitude of seminars and conferences and the growth of newsletters as the most significant events of the last twelve to eighteen months.

With the birth of InfoWindow, there are already several hundred customers owning several thousand InfoWindows, and discs for the InfoWindow are being produced at the rate of fifteen or twenty a month. Manufacturers are realizing that the interactive systems are cost, time and learning effective. As for education, creative and cost effective Level I discs, such as those marketed by Systems Impact, are making a dent.

Lippke, James A. Ed. "Interactive Videodisc Production: Short Segments Raise Continutiy Problems," E-ITV, May, 1987, 30-34

This is part five in a nine part series on the production of videodiscs. This discusses the pre-production stage.

SUMMARY:

This part of the development of a videodisc deals with hundreds of short segments that have to be integrated and coded. During the pre-production stage, appropriate members of the team break down the script, hire talent, survey sites, and get the team of video producer, graphics artist and programmer together. Continuity of the program is of greatest concern in interactive video. When decisions have been made, coding begins.

Lippke, James A. Ed. "Scripting: More complicated Than You Might Think," E-ITV, April, 1987, 22-27.

This is part four of a nine part series on producing videodiscs. This discusses how the scriptwriters work and who they are.

SUMMARY:

Writers know what style and instructional strategies will be used in the disc and they work from these strategies, flow charts and objectives. They need to know the desired length, budget, and target audience. Some may use a storyboard for motion video or animation. Some use grids describing the visual, audio, and programmer parts or four quadrant design sheets which contain computer quadrant, a narrative quadrant, a lower quadrant for video screen, and a fourth quadrant for the computer text and overlays.

Before scripting, the writers look for existing slides, film, tape, and graphics which might affect the script. Scripting for interactive video projects is complex because the writers script for stills, computer text, and for video and the team may need an editor or different kinds of writers - some for the text and some for the video. Scripts are massive and may contain fifteen hundred pages. Graphic, video and audio effects have to be planned concurrently with scripting.

Martorella, Peter H. "Interactive Video Systems in the Classroom, Social Education, May, 1983, 325-327.

Martorella discusses the uses of interactive systems in social studies classes and describes three projects in social studies using new technologies.

SUMMARY:

Although computers can handle many variables at once, can give feedback, and can quickly retrieve large amounts of data, there is not enough visual information to enliven the instruction. But when you combine the new video technology with a computer, you have an interactive video system which allows storage of visual images on tape or disc and when it is combined with computer based instruction, it converts a passive medium to an active medium. With a simple system, computer instruction and output alternate with the videodisc or tape output. With a complex system, the written material can overlay the video image.

Three projects producing social studies materials are Project Cent (Consumer Education and New Technology) which is developing consumer economics lessons on twenty minute video cassettes, the MECC (Minnesota Education Computing Consortium) project which is developing videodiscs on economics, and Project ComICon (Computers to Individualize Concept Learning) is developing material to show instructors how to create their own interactive video systems.

Milheim, William D. et al. "Using Interactive Video for Group Instruction," Educational Technology, June, 1987, 35-37.

This article discusses the use and effectiveness of interactive video in a group setting.

SUMMARY:

Interactive video training at IBM Corporate Development Center compared large group, small group and individualized instruction with traditional lecture based instruction. The percentage of students reaching mastery in the interactive video groups was three hundred percent higher than the group learning in the lecture classroom. Another study describes effective use of Level I interactive video by elementary physical education teachers. A third study shows that using interactive videotape to teach on the job skills to learning disabled and mildly mentally retarded adolescents was more effective than using illustrated workbooks with discussion and role-playing. Interactive video using simulations in the training of servicemen proved superior to hands on training.

Teachers should use interactive video with groups because many learn better in group interaction; the systems are too expensive for individual instruction; schools would have to redesign space for individual stations; newer authoring systems offer teachers help with groups; interactive video helps to stimulate group discussion; and with interactive video the group gets to see the results of a variety of choices.

Nebraska Videodisc Design/Production Group. "How Big is the Videodisc Industry," Teaching With Videodiscs, July, 1986.

This article addresses the questions of how big the interactive video industry is and what place it will have in education.

SUMMARY:

For several reasons, including the reluctance of hardware manufacturers to release sales figures, it is difficult to measure the size of the industry. The Video Monitor reported in 1985, that there were 83,250 systems in use. Of the two major mastering agencies, Pioneer and 3M, 3M masters about two hundred to three hundred custom videodiscs a month.

Arthur Anderson and Company projected that by 1986 there would be almost nine hundred titles in education and training, almost three hundred in merchandising and three hundred in publishing. They project that by 1988, there will be almost forty-five thousand titles in the same ratio.

Nebraska Videodisc Design/Production Group. "Design, Media Production and Premastering Services," Pamphlet. No date.

This pamphlet explains what and where the Nebraska Videodisc Group is and what services it provides.

SUMMARY:

The Nebraska Videodisc Group was established in 1978, through a series of grants to the University of Nebraska from the Corporation for Public Broadcasting. It has designed and produced vaults of video programs and has authored videodisc production and premastering. Through the facilities of the Center, the Nebraska Videodisc Group is able to design, produce, duplicate, store, and distribute every form of instructional technology. They develop videodisc programs for Levels I, II, and III.

Services include consultation at any stage of process, instructional design, scripting, program production special effects, assembly, computer programming and evaluation, disc simulation, and coding and arrangement for mastering and replication. The Group also disseminates a newsletter, presents an annual symposia and conducts several workshops during the year.

Optical Data Corporation. "Can Laser Videodisc Improve Science Education? Most Teachers Will Put Money On It," T.H.E. Journal, September,1987.

This is an advertisement for Optical Data Corporation. It describes a study which tested how teachers felt about interactive video.

SUMMARY:

More than one hundred teachers used videodiscs in a three month period. Eighty-eight percent thought materials should be permanent additions to the curriculum. Student motivation improved eighty-seven percent. Mastery improved seventy-six percent, use of science thinking skills improved seventy-two percent and ninety-three percent of the teachers found it easy to use. Eighty-two percent said it increased their interest in science. Seventy-two percent felt it improved their ability to teach. Eighty percent preferred it to text, slides and videotapes.

Pauline, Ronald F. et al. "Interactive Slide-Sound Instruction: Incorporate the Power of the Computer with High Fidelity Visual and Aural Images," Educational Technology, June, 1987, 27-31.

Pauline describes the strengths and weaknesses of an interactive slide/sound system.

SUMMARY :

With an interactive slide/sound system, sequences and rate of presentation are controlled by a computer program. For this application, you need a computer, a slide/sound projector, an interface device, an authoring language or system, and two disk drives. This particular project used the Apple IIe, the Bell and Howell "Ringmaster" model 860 slide/sound projector and the Bell and Howell Audio Visual Author system.

When the projector is interfaced with the computer in the automatic mode, the computer controls the pacing and sequence. The AVA system has four disks and an instructional manual and allows users to show different sequences, text, graphics, sound questions and feedback and can store and analyze student data. This system is easy to use and allows the creation of small units. The user cannot access specific points on the audio tape and can't rewind the tape to a designated point, but slides can be randomly accessed.

Price, Dr. Barrie Jo et al. "Interactive V ideo Instruction and the Dreaded Change in Education," T.H.E. Journal, May, 1983, 112-117.

This article describes the problems of funding public education and asserts that interactive video instruction can be the solution to replacing teaching personnel and changing the delivery system of education.

SUMMARY:

Educational T.V., computer assisted programs and other forms of passive instruction are inadequate. Also the cost of educational personnel is great. As in business, education needs to replace human labor with machines. Education needs to be less expensive and more effective. The fiscal problems prevent schools from adequately preparing students for the electronic age.

There is an urgent need to use software and technology to compensate for the lack of personnel and instructional inadequacies. The Center for Interactive Technology at the University of Arkansas is developing inter-

active video programs which are meant to be complete courses for use without teachers. They contain problems, graphic illustrations, questions, and competency checks for individualized learning. Interactive video programs have the potential to equal or surpass traditional instructional systems in quality of instruction and in student achievement.

Reid, Nancy. "Premastering Techniques for Efficient Videodisc Production," E-ITV, June, 1987, 32-35.

Reid discusses the issues that need consideration prior to and during the creation of the premaster.

SUMMARY:

First, the developer needs to time each module in the flow chart and identify each element - slides and motion - to make sure all will fit on the disc. Next, the developer must preassemble all elements and make sure it is a high quality generation. All elements need labeling. The developer must make sure the mastering facility understands his requirements and developer must understand their capabilities.

It is best to place the main index, attractor mode and introductory sequence in the middle of the premaster. This eliminates long searching time. Developer should put in short fadeups and fadedowns between all edited segments to make segments smooth. The developer must also know the presser's requirements - all require either a one inch, a three quarter, or Betacam premaster.

Rivlin, Robert. "Local Production Companies Are New England's Latest Cottage Industry," E-ITV, August, 1987, 40-43.

Rivlin describes the services of several New England companies involved in teleconferencing, video production and in interactive video development. He also lists several other companies involved in video technologies.

SUMMARY:

Companies have moved into remote areas because of lower taxes, lower salary requirements, more relaxed atmospheres and less expensive real estate. Praxis Media in South Norwalk, Ct. offers from concept to scripting through post productions services on video projects. They have complete post pro-

duction facilities and teleconferencing services. Insight in Norwalk, Ct. specializes in training tape products. Video Base in Merrimack, N.H. develops video tapes for corporations. Snow Blizzard Productions in Warwick, R.I. develops videos. Cinemed in Woodbury, Ct. and JAM in Rochester, N.Y. develop videodiscs.

Salpeter, Judy. "The Archival Videodisc: A Multi-Media Library You Can Hold in One Hand," Classroom Computer Learning, January, 1987, 49-51.

Salpeter explains what an archival videodisc is and uses a history disc to show how an archival disc can be used in the classroom and explains what will be needed to make it work.

SUMMARY:

An archival disc is a collection of video images, still frames, motion sequences and sound designed to be a resource. Unlike instructional videodiscs which have built in lessons and branching, most archival discs require pre-planning and the use of an index to determine which frame to use. The disc, "The Video Endydlopedia of the Twentieth Century," covers major events from 1893 to the present. It can be used to enhance discussion, to spark discussion, for independent research or as a game in which students search for answers to questions or as a supplement to oral reports.

An archival disc can be used with a remote control (Level I) or the user could use an authoring system to develop an original program for locating frames, for adding captions or prompts, or to develop independent lessons. For this use, the player needs to be interfaced with a computer (Level III).

Salpeter, Judy. "Interactive: The Truth Behind the Promise," Classroom Computer Learning, November/December, 1986, 26-34.

Salpeter discusses what's happening with interactive video technology, what teachers can expect in the classroom, how to get started, and what's available now.

SUMMARY:

Problems in the field of interactive video include expensive development,

incompatabilities in hardware, and lack of descs designed for education. In 1985, fewer than two percent of the nation's schools were using videodiscs, but there are signs of change. Interactive video is a hot item at conerences, more teachers are asking questions about interactive video, Level I has become more standardized and affordable, Levels II and III are becoming more compatible, and the number of educational discs is increasing.

Optical Data and Video Discovery are leaders in the production of archival discs for educational purposes. An archival disc is a visual database of still and motion images and is a great research tool or visual aid. Tutorial discs are mostly for individual use. They contain questions and review and differ from computer tutorials in that they contain photos, videos, graphics and sound.

For under one thousand dollars, a teacher can purchase a player for Level I application. Some teachers may want to wait for the CD-I interactive compact discs which are supposed to be out by the end of 1987.

"A Sampler of Videodiscs for the Classroom," Teaching With Videodiscs, July, 1986.

This article reviews a sampler videodisc.

SUMMARY:

On one side, "College USA, Disc #6" contains information on eleven colleges and on the other side includes an introduction, five sample programs and information on disc capabilities. This side includes samples of "College, USA" - an overview of colleges; "Grolier Electronic Publishing, INc." - an encyclopedia text; "National Geographic Society" disc on whales; "Society for Visual Education, Inc" - an archeological expedition to Mayan, Trojan, Pompeiian and Egyptian Civilizations; "Videodiscovery, Inc" - a general biology disc; and "Index to Videodiscs, by Systems Impact, Inc" which describes sixty-six videodiscs in education. The cost is sixty dollars.

Schwartz, Ed. "Authoring Systems," Classroom Computer Learning, January, 1987, 52-53.

Schwartz defines and describes types of authoring tools and provides a chart explaining what each authoring tool contains, where to get it, and what it costs.

SUMMARY:

There are two kinds of authoring tools. Authoring systems are computer programs for people with little programming experience. Menus allow the user to design programs by responding to menu questions and choices. An authoring language requires the user to know commands and to create programs. Tools vary greatly in price and complexity. Most allow the user to create multiple choice and true/false questions and branching. The simplest system needs to present material on two monitors - one for text and one for video. The more complex systems can be used with one screen either by alternating text and video images or with text and graphics overlay. Many systems have record keeping capabilities. Prices for authoring systems range from eighty dollars to thirteen hundred dollars. Prices for authoring languages range from two hundred dollars to thirteen hundred dollars.

"Vanderbilt Evaluates Systems Impact's Videodiscs," Teaching with Videodiscs, July, 1986.

This is a newsletter compiled by Systems Impact, Inc. It contains current news in the videodisc field. This article describes Vanderbilt University's evaluation of Systems Impact's program, "Mastering Fractions."

SUMMARY:

Part I studied conditions in the Nashville Metropolitan Public School System. In one group, classes used the traditional curriculum. In the second group, classes used the "Mastering Fractions" program without the videodisc, but with the teacher following the "Mastering Fractions" program as closely as possible with the use of an overhead projector. In the third group, the classes used the "Mastering Fractions" videodisc. In each group there was a

high and average achieving class. All were given a pre and post-test. Results showed those receiving the "Mastering Fractions" program, videodisc or not, scored significantly higher than the traditional group.

One hundred and forty-three students from grades five to nine from the Ashville City Schools, Avery County Schools in North Carolina and Lauderdale County Schools in Alabama took part in the second part of the study. Five of the seven classes made significant gains at the .01 level of significance and two at the .05 level of significance. The conclusion is that the "Mastering Fractions" videodiscs results in significant gains in fraction skills and concepts and produces the greatest results when used as designed. The study showed differences in teacher implementation affect student achievement and that the "Mastering Fractions" program was more effective than the existing curriculum.

Weiss, Charles et al. "The Interactive Videodisc for Computer-Assisted Education and Training in Developing Countries," Journal of Educational Technology Systems, Volume 15, 1986-1987, 3-19.

This article describes the possible application of interactive video in training and education in developing countries.

SUMMARY:

Educators are having overwhelming problems in developing countries. Instructors are scarce and students are numerous and spread out. Development assistant agencies could identify training needs common to many projects and countries. People in the developing countries could come to the U.S. for about a year for training in interactive systems.

Possible application of interactive video in developing countries are training in power plant operation and maintenance, locomotive maintenance, telecommunication, engineering, and operation and maintenance of large industrial installations.

"Why and When: Level III," Teaching With Videodiscs, September, 1986.

This article defines Level III and explains what the computer is used for, what is important in Level III application and when the Level should be used.

SUMMARY:

Level III refers to the use of a computer with a videodisc player. Many users think this is the true meaning of interactivity, but the most important interaction is not between pieces of equipment, but between equipment and learner. The computer controls what is displayed and stores data. This is an extra cost for what a teacher does every day. Use Level III only when it adds significant advantage to the lesson or program. For example, when highly complicated branching or sophisticated data management is involved, or when specialized output such as graphics overlay or simulations are necessary, then Level III should be used. Level III is often used for individual programs, but more economical means are available and easier to use. Technological solutions to educational problems are not inherently superior.

Wilson, Doug et al. "Classroom Use: Some Field Tested Ideas - Videodiscs in Science," Classroom Computer Learning, January, 1987, 51, 54.

This article describes several uses of archival videodiscs based on experiences in biology classes in grades five to twelve in Alascadero and Paso Robles, California and in aerospace and physics classes in Lincoln, Nebraska.

SUMMARY:

Using an authoring system, computer and disc player, teachers can combine film clips, animation and slides to create a slide show for a more comprehensive explanation and to supplement lectures. Students can use the discs to illustrate talks. Interactive video is a valuable way to introduce lab work or a way to go on a field trip without really going. It saves setting up microscopes because students can see microscopic slides in seconds. With an authoring system, the teacher can create different lessons for small groups or individuals.